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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

ORIGINAL

In the Matter of

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MM Docket No. 97-217

Amendment of Parts 1, 21 and 74 to Enable
Multipoint Distribution Service

)

)

and Instructional Television Fixed
Service Licensees to Engage in Fixed

)

)

Two-Way Transmissions

)

File No. RM-9060

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

REPLY COMMENTS OF SPIKE TECHNOLOGIES, INC.

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Summary

The Commission's proposal to enhance MDS and ITFS through the use of two-way technology received near universal support from the commenters, Spike included. However, for the full benefits two-way technology to be realized, the Commission must incorporate into the technical rules adopted in this proceeding, sufficient flexibility to allow technological advancements to be translated into viable services in an efficient and expeditious manner.

To achieve these ends, Spike proposes that the definition of "response station hub" be expanded to enable such stations to retransmit collected response station transmissions and to be collocated with booster facilities. This would afford licensees and operators necessary flexibility in designing a new generation of communications systems, and allow for the most efficient use of the spectrum.

The Commission's proposed method for determining interference is based on assumptions that will not hold true for all markets or for all system architectures. Spike joins with other commenters in urging the Commission to allow interference protection to be established by various methods, tailored to take into consideration such variables as anticipated subscriber distribution patterns, terrain characteristics, proposed service offerings and the utilization of TDMA or other access protocols.

Additionally, the Commission must clarify, inter alia, that the technical proposals in the NPRM do not alter current standards governing attenuation of out-of-band emissions.

The Commission should adopt Petitioners' proposal of one-day application filing windows with automatic grants, as modified to incorporate expedited interference resolution procedures. This will work to the benefit of all parties involved in the application process, and will the public interest by expediting the introduction of advanced services into the marketplace.

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REPLY COMMENTS OF SPIKE TECHNOLOGIES, INC.

Spike Technologies, Inc. ("Spike") by its attorneys and pursuant to Section 1.415 of the Commission's Rules, hereby submits its Reply Comments to the comments filed by other parties in response to the above-captioned Notice of Proposed Rulemaking ("NPRM").¹

Introduction

In its Comments in this proceeding, Spike demonstrated that the full benefits of advanced two-way services will never be realized unless sufficient flexibility is incorporated into the technical rules adopted in this proceeding to enable technological advancements to be quickly translated into viable, robust services in an increasingly competitive marketplace. In furtherance of this objective, Spike demonstrated that the new two-way rules should allow for transmit-capable response station hubs to promote maximum efficiency and flexibility in system design and service capability. Spike also demonstrated the need for more flexible and accurate interference calculation procedures because the assumption that the distribution of response station transmitters will closely match population distribution within service areas will not hold true in all instances. Nor is it correct to assume that all response station transmitters will be active at all times for all system architectures.

¹ Spike filed comments in this proceeding on January 8, 1998 ("Spike Comments").

None of the commenters has dispelled the need for transmit-capable response station hubs and greater flexibility as to the method used to show compliance with established interference criteria. In fact, one of the commenters has offered two alternative methods for making interference determinations that are worthy of consideration. Again, Spike strongly urges the Commission to adopt its proposals on these matters. As shown below, the Commission also needs to clarify and/or refine certain other aspects of the proposed technical rules, and streamline the application process to allow for expedited processing of applications.

Discussion

I. Response Station Hub Locations Must Be Transmit-Capable For Efficient System Design And Flexibility In Service Offerings

While no other commenter focused on this specific issue, Spike in its Comments demonstrated that the Commission's proposed definition of "response station hub" is unnecessarily restrictive in that it limits such facilities to the collection of upstream transmissions from response stations. Under this definition, response station hubs are not specifically allowed to transmit or share facilities with MDS/ITFS booster stations. Spike therefore proposed a revised definition of response station hub that would explicitly permit such facilities to retransmit the collected response station transmissions and/or share facilities with MDS/ITFS booster stations.²

With the ability to both transmit and receive, a collocated response station hub/booster station

² Spike proposed the following definition of response station hub: "A fixed facility licensed for use in accordance with § 21.909 that is operated by an MDS licensee or the lessee of an MDS facility for the reception and/or retransmission of information transmitted by one or more MDS response stations. A response station hub licensed under this part may share facilities with other MDS response station hubs and/or ITFS response station hubs authorized pursuant to § 74.939 and/or with signal booster stations authorized pursuant to §§ 21.913 and/or 74.985." Adoption of this definition would require corresponding revisions to other rule sections such as §§ 21.909 and 74.939. Spike Comments at 3.

would be the only facility required to integrate communications by and between various points in a network. The practical benefits of Spike's proposed response station hub definition are considerable. Spike maintains that significant efficiencies can be realized in recognizing response station hubs as singular, bi-directional facilities in their own right, and that new, two-way systems should not require dissection into one-way pieces, either to analyze or to build. In Spike's two-way systems, only one piece of RF equipment is required at the hub site, the PRIZM transceiver. Because receive and transmit functions are accomplished by the very same hardware item, to require (at least) two applications to license this and similar integrated facilities, as the proposals in the NPRM would, is inefficient and is not warranted.

Spike's proposal allows for a simpler and more streamlined application process, as applications for transmit-capable response station hubs would contain one comprehensive interference analysis which considers both upstream response station interference and interference from downstream hub transmissions. Not only would fewer total applications be required to authorize two-way facilities under Spike's proposal, but researching previously-proposed and authorized systems will be easier because one application will provide interested parties with information on both upstream and downstream signal characteristics.

Citing its real-world operating experience in Nashua, New Hampshire and in South America, Spike also demonstrated in its Comments that transmit-capable response station hubs perform well operating at the same low power levels as response stations, and that cell size can easily be manipulated by adjusting these modest power levels.³ Because fewer higher powered booster facilities are needed, less RF radiation is emitted, thereby reducing the potential for harmful

³ Spike Comments at 4-5.

interference.

Permitting response station hubs to operate in the manner proposed by Spike will allow two-way systems to be deployed more efficiently with less equipment, at substantially reduced costs, and with less potential for interference. Again, Spike strongly urges the Commission to allow for transmit-capable response station hubs.

II. Additional Flexibility In Demonstrating Compliance With Interference Standards Will Result In More Accurate Interference Protection Assessments

In its Comments, Spike noted that although it did not oppose the proposed three-step response station interference calculation process outlined in the NPRM,⁴ the proposed methodology incorrectly assumes that the distribution of response stations will closely match population distribution within the service area in all cases, and that all response station transmitters will be active at all times for all system architectures, which certainly does not hold true for systems such as those operated by Spike which use a Time Division Multiple Access (“TDMA”) control protocol.⁵ Thus, as Spike demonstrated, flexible methodologies for determining interference should be adopted to accommodate differences in system design and service offerings.

Petitioners recognize Spike’s concerns, stating that “it will be appropriate to modify the methodology advanced in ... the NPRM to reflect that in many cases, the access protocol to be employed only permits a single response station to operate on a given channel at a time within a given sector, as is the case with TDMA.”⁶ The Petitioners also indicate that they are exploring

⁴ NPRM at ¶¶ 34-38.

⁵ Spike Comments at 6-7.

⁶ Petitioners’ Comments at 65.

“appropriate revisions” and intend to submit a more formal, revised proposal addressing response station interference calculation.⁷

Also recognizing the shortcomings of the methodology proposed in the NPRM, EDX Engineering, Inc. (“EDX”), proposes an entirely different and relatively simple method of calculating interference from response stations. Instead of relying on the trial-and-error development of a grid as proposed in the NPRM to represent the expected distribution of response station transmitters, EDX, borrowing from established Personal Communications Service (“PCS”) interference calculation techniques, advocates use of a representative, centrally-located transmitter to model propagation of energy from response station transmitters.⁸ Although Petitioners correctly note that this method may not work well in markets where terrain shielding is a significant factor,⁹ Spike believes that this method may prove useful in areas where such is not the case. Due consideration of EDX’s methodology is clearly warranted in such circumstances.

EDX offers a second approach for calculating interference from response station transmitters based on the establishment of grid points at uniform geographical spacings which may be adjusted to account for terrain variations.¹⁰ While this approach also has merit, Spike believes that the Commission should allow applicants to tailor grids to more realistically account for anticipated subscriber distribution patterns, foliage and climatic variations, the utilization of TDMA or other protocols, terrain profiles, line of sight considerations, and other market specific information and

⁷ Id.

⁸ EDX Comments at 8-9.

⁹ Petitioners’ Comments at 60.

¹⁰ EDX Comments at 5.

system design characteristics critical to the accuracy of any interference calculation.

No single interference calculation method is suitable in all situations. As long as an applicant adequately describes the proposed system and facilities, the actual interference calculation procedures used, the service(s) to be provided and any assumptions made in the analysis, the Commission should allow flexibility as to the method used to show compliance with established interference criteria.

III. The Commission Should Clarify That Out-of-Band Emission Attenuation Is Relative to Total Channel Power

As in the Digital Declaratory Ruling (“DDR”),¹¹ wherein the Commission first authorized digital transmissions over MDS and ITFS channels, the proposal outlined in the NPRM would require the attenuation of out-of-band emissions to be relative to the licensed average power level.¹² The licensed average power level limit has been defined as being equal to the peak analog visual power, or 2000 W EIRP.¹³ Spike believes, as does Nextlevel Systems, Inc. (“Nextlevel”), that out-of-band emissions are intended by the Commission to be measured relative to total channel power (the licensed average power level).¹⁴ Currently, 60 dB of attenuation at +/- 3 Mhz offset relative to

¹¹*Declaratory Ruling and Order, In the Matter of Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations*, 11 FCC Rcd 18839 (1996).

¹² DDR at ¶¶ 21, 27; NPRM at ¶ 20.

¹³ DDR at ¶ 27; NPRM at ¶ 42.

¹⁴ Nextlevel Comments at 3.

licensed average channel power is required, as illustrated in Figure 1 attached hereto.¹⁵ Spike does not discern from the NPRM that the Commission intends to require further reduction in out-of-band emissions in promoting conversion from analog to digital technologies. In fact, such reduction would be inconsistent with the Commission's stated goal of promoting the rapid introduction of digital wireless cable systems and services by permitting the continued use of existing transmission equipment.¹⁶

Although Spike agrees with Petitioners' efforts to incorporate flexibility in the establishment of measurement techniques without advocating a single, mandatory resolution bandwidth,¹⁷ Petitioners may have introduced an ambiguity as to the actual attenuation required under the current (and proposed) Rules.¹⁸ Specifically, the Petitioners note that their derived "relative power measurement formula yields just the attenuation required by the proposed Rules when the same resolution bandwidth is used for both measurements."¹⁹ Petitioners' equations result in the required attenuation being relative to the "flat top" of the digital spectral wave form, and not to the licensed average channel power as the DDR and NPRM have specified.²⁰ For a 6 MHz channel with out-of-band energy measured in a 100 kHz resolution bandwidth, 78 dB of attenuation relative to total

¹⁵ DDR at ¶ 21. This discussion applies equally to the 38 dB of attenuation required at the channel edge (35 dB in the case of 125 kHz channels).

¹⁶DDR at ¶ 25.

¹⁷ Petitioners Comments at 127-132.

¹⁸ In the absence of sub- and superchannelization, Spike would consider 100 kHz to be an appropriate resolution bandwidth.

¹⁹ Petitioners' Comments at 131.

²⁰ Id.

channel power is required at +/- 3 MHz offset, which is 18 db more stringent than the current Rules. The effect of Petitioners' formulas is to increase the attenuation required. *See* Figure 2, attached.

Spike recognizes that the DDR establishes the need to maintain uniform spectral density across the channel bandwidth and defines an average digital wave form level (the "flat top").²¹ While Spike agrees with the established uniform spectral density requirements, Spike maintains that the average "flat top" level cannot at the same time be the average licensed power level (2000 W EIRP). If the "flat top" were in fact the licensed level, transmitter output power would need to be on the order of 1000 Watts total with 20 dB of antenna gain (100,000 W/6MHz EIRP) in order to evenly distribute the licensed level evenly across the 6 MHz channel. Like Nextlevel, Spike seeks clarification that attenuation is in fact relative to total (licensed) channel power (and not to the average level of the digital spectral wave form), and that no change to the currently permissible out of band emission levels was intended by the proposals set forth in the NPRM.²²

IV. Additional Technical Issues

Frequency Tolerance

The Commission has correctly recognized that frequency tolerance is not relevant to digital

²¹DDR at ¶ 26.

²² Spike recognizes that, in the context of sub- and superchannels, it may be appropriate to define the spectral mask so that attenuation is indeed made to be relative to the average level of the digital spectral wave form (the "flat top"). Under such a definition, however, it would be necessary to adjust the specified required attenuation to account for the change in the reference level. As shown in Figure 1, in maintaining the currently-permissible out-of-band energy level, attenuation relative to the "flat top" would be 20 dB at the 6 MHz channel edge and 42 dB at +/- 3 MHz channel edge offset.

modulation.²³ Emissions should be maintained within the spectral mask for all transmitters. It may, however, be appropriate to impose frequency tolerance limits on pilot carrier frequencies commonly used in VSB and possibly other modulation systems.

Noise Floor

In their comments, Petitioners introduce a new concept for calculating interference protection of receivers. They point out that affording 45 dB of co-channel protection is overly protective when the level of the desired signal approaches the noise floor of a receiver and the level of the undesired signal does not significantly contribute to the noise level.²⁴ Spike agrees that demonstrating compliance with the 45 dB benchmark should not be required when it can be shown that the undesired signal level is below the noise floor of the subject receiver.

Hub Protection

In responding to the Commission's concern that an applicant could specify an inappropriate required receive signal level in order to secure undue protection to its response station hub, Petitioners propose the use of power flux density limits in lieu of desired to undesired signal ratios in defining required hub protection. Spike agrees that this is a sound approach that will result in adequate response station hub protection while alleviating the Commission's concerns.²⁵

Spurious Emissions Relief

The Commission must resolve a discrepancy in its treatment of spurious emissions relief. Proposed Rule Section 21.908 (c) would make the proposed relief applicable to all response

²³ DDR at ¶ 32, NPRM at ¶ 24.

²⁴ Petitioners' Comments at 63.

²⁵ Id at 67-71.

channels. However, in the NPRM,²⁶ such relief is discussed only in the context of response stations using 125 kHz response channels. The relief should apply to all response channels as set forth unambiguously in the proposed Rule.

V. The Application Process Must Be Streamlined

Spike agrees with the commenters who support adoption of streamlined application processing procedures to obviate processing delays and expedite the provision of new, advanced services to the public.²⁷ Petitioners have proposed a new processing scheme based on rolling, one day filing windows and automatic grants.²⁸ Spike urges the adoption and implementation of this processing scheme by the Commission, with the modifications and refinements discussed below.

Certain commenters express concern that ITFS licensees lack the wherewithal to evaluate applications under this scheme.²⁹ Spike believes these concerns are exaggerated.

Many if not most ITFS licensees now rely on the wireless operator to monitor and evaluate applications that might effect the ITFS licensee's station, a task that the operator has every incentive

²⁶ NPRM at ¶ 22.

²⁷ *See e.g.* Petitioners' Comments at 15-16.

²⁸ Petitioners propose an initial one week filing window to accommodate what is expected to be a significant number of applications at the outset. A 60-day settlement and amendment period would follow the initial filing window during which mutually exclusive applicants would have the opportunity to resolve interference and other issues. This would be followed by a 60-day period during which petitions to deny could be filed. If no such petitions are filed, the application would be automatically granted on the 61st day after the application appears on public notice, unless the Commission, on its own, determines that unresolved issues preclude automatic grant. Petitions for Reconsideration could be filed within 30 days of grant, and the Commission on its own motion may reconsider grant of such applications within 40 days. *See* Petitioners' Comments at 18-29.

²⁹ *See e.g.* ITFS Parties Comments at 7-8; HITN Comments at 4.

to do thoroughly, as interference to its ITFS-lessor means interference to the operator's system. ITFS licensees that do not lease excess channel capacity to wireless cable operators presumably have the ability to evaluate potential interference on their own, or have legal and/or engineering advisors to help them in this regard. Adoption of the proposed scheme should not have a major impact in either case.

Moreover, multiple layers of protection are incorporated into the proposed processing scheme:

- 1) Applicants are required to identify and demonstrate interference protection to incumbents and serve them in all cases with a copy of the application. This protection goes beyond what is currently required.
- 2) The Commission is required to review all applications for completeness and to make a determination that all previously licensed and proposed facilities have been analyzed or have given consent.
- 3) Incumbents are afforded a full sixty days to file a petition to deny - twice the current petition period - and will also have the right to seek reconsideration within 30 days of grant.
- 4) The FCC may, on its own motion, reconsider a grant of authorization.
- 5) Holders of automatically granted authorizations will be required to cure interference to incumbents.

As an additional safeguard, Spike joins the San Francisco-San Jose Educator/Operator Consortium ("Consortium") in urging the FCC to adopt expedited procedures for the resolution of interference complaints.³⁰ The Consortium suggests that the Commission adopt dispute resolution procedures similar to those recently proposed by the Commission in connection with tower siting

³⁰ See Consortium Comments at 19-20.

disputes,³¹ which permit the aggrieved party to petition the FCC for a fast-track declaratory ruling or pursue alternative dispute resolution procedures.³² The adoption of similar procedures here would allow for the prompt and efficient resolution of interference complaints and would provide licensees with an important additional safeguard.

In addition, the scope of the proposed processing scheme is not entirely clear from Petitioners' Comments. Spike believes that the new scheme should apply to all MDS and ITFS applications, with the exception of applications for new ITFS stations. All applicants, including applicants for new as well as modified MDS facilities and modified ITFS facilities, should be allowed to benefit from these expedited procedures.

³¹ See *In the matter of Preemption of State and Local Zoning and Land Use Restrictions on the Siting, Placement and Construction of Broadcast Station Transmission Facilities*, FCC 97-296, 62 Fed. Reg. 46241 (Aug. 19, 1997) ("Tower Siting Notice").

³² Under the proposed tower siting rules, where a local government denies a request to construct or modify a transmission tower, the broadcaster may petition the FCC for a declaratory ruling within 30 days of the local ruling. The Commission would be required to act on such petition within 30 days. Under this proposal, the broadcaster also has the option of electing alternative dispute resolution procedures to resolve the conflict, in which case it would file an election notice with the FCC within 10 days of the adverse local decision. The Commission would then have 15 days to appoint an arbitrator, and conduct and complete the arbitration. See Tower Siting Notice at ¶ 9 and at Appendix B(d).

Conclusion

ITFS and MDS frequencies for the provision of advanced, two-way services by allowing for transmit-capable response station hubs and alternative interference calculation methods that can more accurately reflect real-world considerations. The Commission must streamline the ITFS/MDS application process, and clarify its proposed technical rules in the manner outlined above to ensure efficient use of the spectrum and protection to incumbents and newcomers alike.

SPIKE TECHNOLOGIES, INC.

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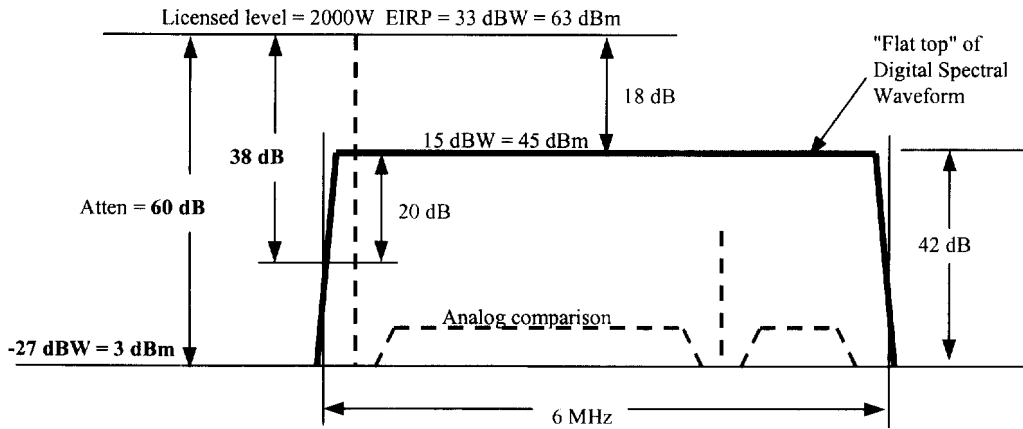
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Figure 1: Attenuation relative to licensed average channel power (2000W)



For both examples:

Licensed average power level = Total power in a 6 Mhz channel.

Out-of-band and "flat-top" levels based on 100 kHz measurement resolution bandwidth.

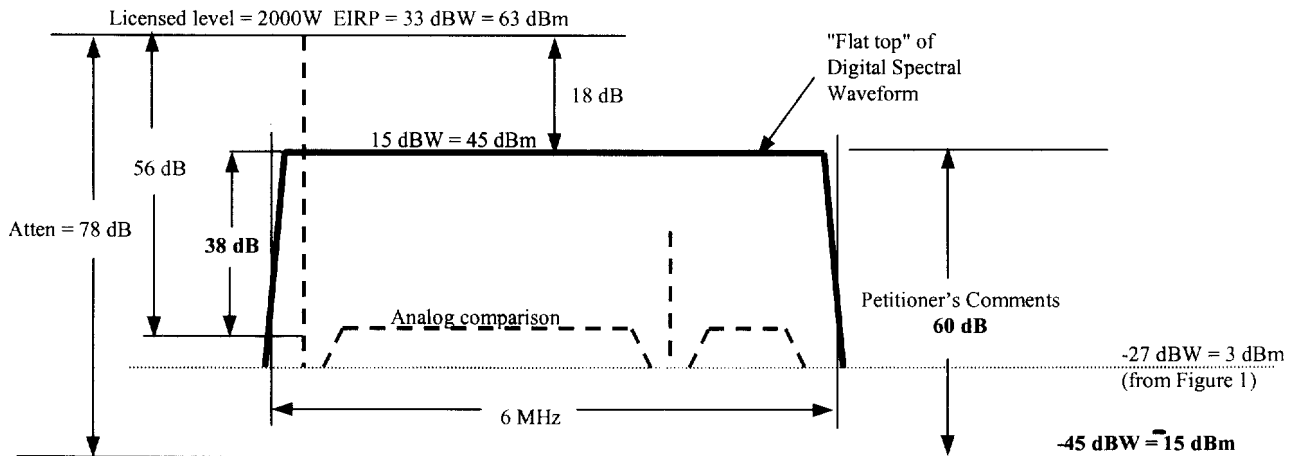
60 dB attenuation is measured at +/- 3 Mhz offset from channel edge.

The same rationale applies to 38 dB attenuation at the 6 MHz channel edge, and 35 dB attenuation at the 125 kHz channel edge.

Average level of digital spectral waveform (flat-top) is below total power by:

$$10 \log_{10} (\text{Channel}_{BW} / \text{Res}_{BW}) = 10 \log_{10} (6\text{MHz} / 100\text{kHz}) = 17.8 \text{ dB}$$

Figure 2: Attenuation relative to "flat-top" power



CERTIFICATE OF SERVICE

I, Yvette King, a secretary with the law firm of Rini, Coran & Lancellotta, P.C., do hereby certify that I caused a copy of the foregoing "Reply Comments of Spike Technologies, Inc." in MM Docket No. 97-217 to be mailed first-class, postage prepaid, this 9th day of February, 1998 to the following:

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